

matious matter of the Crinoid could doubtless have passed out under the foot of the *Platyceras*, supposing the opening in the Crinoid sometimes covered by these shells to have been the anus, but it is difficult to conceive how food could have passed in, if we suppose this opening to be the mouth.

### On the Seed Vessels of FORSYTHIA.

BY THOMAS MEEHAN.

*Forsythia suspensa* Vahl., and *F. viridissima* Lindl., two Chinese plants, have I believe, never been known to produce perfect seed, though common in cultivation. The latter rarely produces capsules; the former bears capsules freely, but no perfect seed.

These two plants have strong specific differences; yet my studies in development, as published in papers in our Proceedings, lead me to believe them to have an unity of origin. Noticing last spring that the stamens in *F. suspensa*, and the pistil in *F. viridissima*, were relatively more highly developed, I supposed the two might possibly be, as we say practically, male and female forms of the same thing. I impregnated flowers of *F. viridissima* with pollen from *F. suspensa*, and for the first time had the opportunity of examining perfect capsules of this species. The seeds, however, though apparently mature, proved imperfect on dissection. There is no doubt but that *F. suspensa* conferred on the other the power to produce capsules,—why not the additional power of perfect seeds is a mystery,—though not more so perhaps than that it should itself be able to produce only seedless capsules. Another form is probably missing, necessary to fertilize the plant and furnish the wanting link to prove the hypothesis of a unity of origin.

But some useful facts proceed from the experiment. The capsule of *F. viridissima* I believe has never been described. Lindley, the author of the species, does not seem to have seen it. It is broadly ovate, sharp pointed, and wrinkled, carpels of a thin papery texture, bivalvate. Seeds resembling small grains of white wheat, wingless, developing upwards a swell as down from the funiculus, shining, and profusely pitted with small dots. The peduncles are rather shorter than the pods. *One capsule was four-celled, with seeds in each division.*

*F. suspensa* is variously described by different authors. Bunge says the capsule is "about four-seeded," Endlicher "few," and Zuccarini "numeros." The author makes the seeds "narrowly winged." I find the capsule narrowly lanceolate, ligneous, and verrucose, on pedicels double its length, composed of two carpels, in one of which I counted sixteen immature winged seeds; one, however, was fully developed, although as in the other form imperfect, and this was wingless, exactly resembling those of *F. viridissima* in all but color, which was a little darker.

The chief interest is the relation these capsules exhibit to Syringa and to the allied orders of Solanaceæ and Jasminaceæ. It was plain in the four-celled capsule of *F. viridissima* that placentous matter pushes out from the central axis in four directions, though usually the *two alternates are destitute of ovules*. When barren it is most highly developed. On perfect seeds it forms no margin; on imperfect ones a wing, until in Syringa, where the productive division bears only a single winged seed, the unproductive one is expanded into a long broad wing, pushing through the whole length of the incurved carpellary margins, cementing them closely together, and thus necessitating the peculiar dorsal dehiscence familiar in the common Lilac. A slight difference in the vigor of placentous development constitutes the chief cause of the differences in these three forms of capsule.

The polyspermous placentation of Forsythia indicates an approach to Solanaceæ, and the erect tendency of the seeds to Jasminaceæ.

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